

MATHEMATICS - PROBABILITY

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LESSON OBJECTIVES

- Probability
- Dependent and independent events
- Venn diagrams
- Tree diagrams
- Contingency tables
- Counting principles



Probability

- It is the measure of likelihood that an event will happen and it is given on a numerical scale from 0 to 1.
- A probability of 0 indicates that the event is **impossible.**
- A probability of 1 indicates that the event is **certain** to happen.

All other events have a probability between 0 and 1.

• **Probability**= $\frac{Number of successful outcomes}{Number of possible outcomes}$

Examples

A bag contains 6 red balls, 8 green balls and an unknown number of yellow balls. The probability of randomly choosing a green ball from the bag is 25%.

- 8.1 Show that there are 32 balls in the bag.
- 8.2 A ball is drawn from the bag, the colour is recorded and it is not returned to the bag. Thereafter another ball is drawn from the bag, the colour is recorded and it is also not returned to the bag.

Draw a tree diagram to represent ALL the possible ways in which the two balls could have been drawn from the bag. Show the probabilities associated with EACH branch, as well as the outcomes.

8.3 Calculate the probability that the two balls drawn from the bag will have the same colour.

(4)

(1)

9.1 On a flight, passengers could choose between a vegetarian snack and a chicken snack. The snacks selected by the passengers were recorded. The results are shown in the table below.

SNACK	MALE	FEMALE	TOTAL
Vegetarian	12	20	32
Chicken	55	63	118
TOTAL	67	83	150

Was the choice of snack on this flight independent of gender? Motivate your answer with the necessary calculations.

9.2 For any two events, A and B, it is given that P(A and B) = 0,12, P(A or B) = 0,83and P(B) = 4 P(A).

9.2.1 Are events A and B mutually exclusive? Justify your answer. (2)

(5)

- 9.2.2 Calculate P(B). (4)
- 9.2.3 Calculate P(not A). (2) [13]

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Venn diagrams

- Let S denote the set of whole numbers from 1 to 15, X denote the set of even numbers from 1 to 15 and Y denote the set of prime numbers from 1 to 15.
- Draw a Venn diagram depicting S, X and Y .



Venn diagram



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Dependent and independent events

- Two events are mutually exclusive if they can not happen at the same time (simultaneously).
- Dependent events are those events that affect each other and independent events they do not affect the happening of each other.



Grade 12 questions

12.1 Given: P(A) = 0,45; P(B) = y and P(A or B) = 0,74

Determine the value(s) of y if A and B are mutually exclusive.

(3)

12.2 An organisation decided to distribute gift bags of sweets to a Grade R class at a certain school. There is a mystery gift in exactly $\frac{1}{4}$ of the total number of bags.

Each learner in the class may randomly select two gift bags of sweets, one after the other. The probability that a learner selects two bags of sweets with a mystery gift is $\frac{7}{118}$. Calculate the number of gift bags of sweets with a mystery gift inside.

(6)

- 11.1 Events A and B are independent. P(A) = 0,4 and P(B) = 0,25.
 - 11.1.1 Represent the given information on a Venn diagram. Indicate on the Venn diagram the probabilities associated with each region.

(3)

(2)

- 11.1.2 Determine P(A or NOT B).
- 11.2 Motors Incorporated manufacture cars with 5 different body styles, 4 different interior colours and 6 different exterior colours, as indicated in the table below.



Exercise:

A survey was conducted among 100 Grade 12 learners about their use of Instagram (I), Twitter (T) and WhatsApp (W) on their cell phones. The survey revealed the following:

- 8 use all three.
- 12 use Instagram and Twitter.
- 5 use Twitter and WhatsApp, but not Instagram.
- x use Instagram and WhatsApp, but not Twitter.
- 61 use Instagram.
- 19 use Twitter.
- 73 use WhatsApp.
 - 14 use none of these applications.



(2)

(4)

(2)



THANK YOU!

• Belgium Campus wish you good lucky!

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